

Application No. 10/027,667
Docket No. 8828LS
Response dated February 8, 2007
Reply to Office Action of September 14, 2006
Customer No. 27752

REMARKS

Claims 1-29, 31-32, and 41 are pending and have been rejected in the present application. Claim 94 has been withdrawn from consideration. Claims 1-2, 32 and 41 have been amended. No new matter has been added.

Claim 1 has been amended to recite an apparatus comprising, *inter alia*, "at least one non-barrier electrolytic cell further comprising: an anode; a cathode, and a passage . . . having a distance between said anode and said cathode of less than about 0.6 mm; an inlet port . . . configured to receive a flow of electrolytic solution comprising from about 10 to about 200 ppm of sodium chloride; and an outlet port . . . configured to provide an exit for the electrolytic solution comprising from about 2 ppm or less of chloride ions; and a direct current power supply . . . and an electrolytic solution comprising natural water and residual salts, wherein said natural water is selected from the group consisting of well water, river water, tap water, softened water, industrial process water and waste water." (emphasis added). Support for the claim amendment is found in Applicant's specification, at least on p. 5, l. 18-20 and p. 6, ll. 27-31.

Claim 32 has been amended to recite an apparatus for electrolyzing *natural water* comprising, *inter alia*, "at least one non-membrane electrolytic cell further comprising: an anode comprising a surface area of less than about 30 cm²; a cathode, and a passage . . . having a distance between said anode and said cathode of less than about 0.6 mm; an inlet port . . . configured to receive a flow of un-electrolyzed natural water comprising from about 10 to about 200 ppm of a naturally-present halide salt; and an outlet port . . . configured to provide an exit for the electrolyzed natural water comprising from about 2 ppm or less of halide ions; and a current power supply." (emphasis added). Support for the claim amendment is found in Applicants' specification, at least on p. 5, ll. 19-21 and p. 11, ll. 20-25.

FORMAL MATTERS

REJECTION UNDER 35 U.S.C. § 112, Second Paragraph

Claims 2 and 41 stand rejected under 35 U.S.C. § 112, second paragraph, for insufficient antecedent basis. The rejection is respectfully traversed. Claims 2 and 41

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have been amended to obviate the Examiner's concerns. Specifically, claim 2 now recites, *inter alia*, that the "*apparatus yields a Productivity Index of at least 300,*" (emphasis added), and, claim 41 now recites, *inter alia*, that the "*a filter is positioned after said electrolytic cell and . . . is removable by the filter.*" (emphasis added). The Examiner's approval is respectfully solicited, and the 35 U.S.C. § 112, second paragraph, rejections should be withdrawn for claims 2 and 41.

ART REJECTIONS

REJECTIONS UNDER 35 USC §103(a)

Rejection over Kelley in view of Spence

Claims 1, 3, 4, 22, 23 and 32 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,306,281 ("Kelley") in view of U.S. Patent No. 4,414,070 ("Spence"). The rejection is respectfully traversed.

Applicants respectfully direct the Examiner's attention to the "Amendments" section of the instant paper, in which Applicants have amended independent claims 1 and 32, to particularly point out and distinctly claim the subject matter that the Applicants regards as their invention. Support for the present amendment is found throughout the specification and claims, as originally-filed. No new matter has been introduced.

As such, Applicants respectfully submit that Kelley does *not* disclose that *an inlet is configured* to allow influent to enter the inlet at about 10 to about 200 ppm, much less that *an outlet is configured* to allow effluent to exit out the outlet at about 2 ppm or less. In contrast, Kelley discloses 50,000 ppm (Example 1), 20,000 ppm (Example 2), 10,000 ppm (Example 3), 1 gram per liter, *i.e.*, 1000 ppm (Example 4), and similar configurations for the influent inlet. Moreover, Kelley discloses a chlorine dioxide content of 150 ppm (Example 8), 350 ppm (Example 7), 4000 ppm (Example 10), 5 ppm (Example 11), and similar configurations for the effluent outlet.

As such, Applicants respectfully submit that the cited references do not disclose or suggest an apparatus with "an inlet port . . . configured to receive a flow of electrolytic solution comprising from about 10 to about 200 ppm of sodium chloride; and an outlet port . . . configured to provide an exit for the electrolytic solution comprising from about 2 ppm or less of chloride ions, much less an electrolytic solution comprising natural water and residual salts," as recited in claim 1. Similarly, the cited references do not teach or suggest "[a]n apparatus for electrolyzing natural water comprising . . . an inlet port . . . configured to receive a flow of un-electrolyzed natural water comprising from about 10 to

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about 200 ppm of a naturally-present halide salt; and an outlet port . . . configured to provide an exit for the electrolyzed natural water comprising from about 2 ppm or less of halide ions," as recited in claim 32.

At the outset, Applicants respectfully note that Kelley and Spence are completely silent about surface area. The cited references must teach *or* suggest *all* claim limitations for a proper rejection under 35 U.S.C. § 103(a). The Office Action has not provided any support that the references disclose or suggest "an anode with *a surface area of less than about 30 cm²*," as recited in claim 32 (emphasis added).

Further, the present invention relates to "generating mixed oxidants . . . from aqueous solutions containing *naturally present salts*." (Applicants' specification, p. 1, ll. 7-10). In other words, the invention relates to electrolyzing *untreated water*, such as well water, tap water, softened water, industrial process water, and waste waters to form an effluent solution with essentially only *naturally present* chloride ions present (Applicants' specification, p. 6, ll. 26-31). Adding salts or electrolytes is not required with Applicants' claimed apparatus.

In fact, the addition of other salts or electrolytes may increase the conductivity; but, may not necessarily result in higher productivity efficiency since an increase in current draw results (Applicants' specification, p. 7, ll. 3-7). Consequently, the present apparatus, by configuring the inlet port to allow about 10 to about 200 ppm of sodium chloride and the outlet port configured to allow effluent from about 2 ppm or less, provides a high productivity efficiency for the apparatus. Neither Kelley nor Spence teaches or suggests an inlet or outlet port with Applicants' claimed configurations. Moreover, Kelley and Spence do not disclose or suggest using *naturally-present* salts.

Still further, the Office Action acknowledges that Kelley does not disclose or suggest that the passage between the anode and cathode is less than about 0.6 mm in size (p. 5). Spence is relied upon for disclosing that the efficiency of electrolytic cells is dependent on the anode-cathode distance (Col. 1, ll. 24-29), and adds nothing to rectify the deficiencies associated with Kelley. The Office Action asserts it would have been obvious to routinely optimize the gap between the anode and cathode to achieve a minimized spacing such as less than 0.6 mm to improve cell efficiency.

Applicants respectfully submit that the Office Action is misinterpreting the teachings of Spence. Col. 1, ll. 24-29 of Spence, indicates that "cell efficiency is dependent on the anode-cathode distance . . . and the subjacent electrolyte-metal interface." (emphasis added). In other words, Spence's teachings relate to an electrolytic

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cell with multiple subjacent electrolyte-metal interfaces. In this manner, Spence discloses an anode positioning system that raises and lowers the anodes. Spence does *not* teach or suggest that the *gap* between the anode and cathode is a result effective variable as the Office Action asserts. As such, Kelley and Spence, even if properly combinable which they are not, still would not teach or suggest that "a distance between said anode and said cathode of less than about 0.6 mm," as recited in independent claims 1 and 32.

Claims 3, 4, 22, and 23 depend from claim 1 and should be similarly allowable with claim 1 for at least the reasons provided above with regard to claim 1, and on their own merits. Consequently, the § 103(a) rejection of claims 1, 3, 4, 22, 23 and 32 should be withdrawn.

Rejection over Kanekuni

Claims 1-4, 22-24, 29, 31 and 32 stand rejected to under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,954,939 ("Kanekuni"). The rejection is respectfully traversed.

Applicants respectfully direct the Examiner's attention to the "Amendments" section of the instant paper, in which Applicants have amended independent claims 1 and 32, to particularly point out and distinctly claim the subject matter that the Applicants regards as their invention. Support for the present amendment is found throughout the specification and claims, as originally-filed. No new matter has been introduced.

As such, Applicants respectfully submit that Kanekuni does not disclose or suggest an apparatus comprising, *inter alia*, "an inlet port . . . configured to receive a flow of electrolytic solution comprising from about 10 to about 200 ppm of sodium chloride; and an outlet port . . . configured to provide an exit for the electrolytic solution comprising from about 2 ppm or less of chloride ions, much less an electrolytic solution comprising natural water and residual salts," as recited in claim 1. Similarly, the cited references do not teach or suggest "[a]n apparatus for electrolyzing natural water comprising . . . an inlet port . . . configured to receive a flow of un-electrolyzed natural water comprising from about 10 to about 200 ppm of a naturally-present halide salt; and an outlet port . . . configured to provide an exit for the electrolyzed natural water comprising from about 2 ppm or less of halide ions," as recited in claim 32.

At the outset, Applicants respectfully note that Kanekuni is completely silent about surface area. The cited reference must teach *or* suggest *all* claim limitations for a proper rejection under 35 U.S.C. § 103(a). The Office Action has not provided any

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support that the reference discloses or suggests "an anode with *a surface area of less than about 30 cm²*," as recited in claim 32 (emphasis added).

Moreover, there is no support provided in the Office Action that Kanekuni discloses or suggests that the passage between the anode and cathode is less than about 0.6 mm in size. The Office Action indicates that (figures 1, 4-9, 11(a) and 11(b), Test 1 (cols. 13-15) and table 1 (col. 25), provides support for this assertion. Applicants have reviewed the cited text and do not see that Kanekuni discloses that the passage between the anode and cathode is less than about 0.6 mm.

Claims 2-4, 22-24, 29, 31 depend from claim 1 and should be similarly allowable with claim 1 for at least the reasons provided above with regard to claim 1, and on their own merits. Consequently, the § 103(a) rejection of claims 1-4, 22-24, 29, 31 and 32 should be withdrawn.

Rejection over Kanekuni in view of Weakly

Claims 5-21 and 41 stand rejected to under 35 U.S.C. § 103(a) as being unpatentable over Kanekuni in view of U.S. Patent Application No. 2002/0157966 ("Weakly"). The rejection is respectfully traversed.

Claims 5-21 depend from claim 1 and should be similarly allowable with claim 1 for at least the reasons provided above with regard to claim 1, and on their own merits. Claim 41 depends from claim 32 and should be similarly allowable with claim 32 for at least the reasons provided above with regard to claim 32, and on its own merits.

For instance, Kanekuni, alone or in combination with Weakly, does not disclose or suggest an apparatus comprising, *inter alia*, "an inlet port . . . configured to receive a flow of electrolytic solution comprising from about 10 to about 200 ppm of sodium chloride; and an outlet port . . . configured to provide an exit for the electrolytic solution comprising from about 2 ppm or less of chloride ions, much less an electrolytic solution comprising natural water and residual salts," as recited in claim 1, or "[a]n apparatus for electrolyzing natural water comprising . . . an inlet port . . . configured to receive a flow of un-electrolyzed natural water comprising from about 10 to about 200 ppm of a naturally-present halide salt; and an outlet port . . . configured to provide an exit for the electrolyzed natural water comprising from about 2 ppm or less of halide ions," as recited in claim 32.

Similarly, the cited references do not disclose or teach an apparatus comprising, *inter alia*, "an anode with a surface area of less than about 30 cm²," as recited in claim 32,

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or "having a distance between said anode and said cathode of less than about 0.6 mm," as recited in claims 1 and 32. Claims 5-21 depend from claim 1 and should be similarly allowable with claim 1 for at least the reasons provided above with regard to claim 1, and on their own merits. Claim 41 depends from claim 32 and should be similarly allowable with claim 32 for at least the reasons provided above with regard to claim 32, and on its own merits. Consequently, the § 103(a) rejection of claims 5-21 and 41 should be withdrawn.

Rejection over Kanekuni in view of Beer

Claims 25 and 26 stand rejected to under 35 U.S.C. § 103(a) as being unpatentable over Kanekuni, and further in view of U.S. Patent No. 3,632,498 ("Beer"). The rejection is respectfully traversed.

Claims 25-26 depend from claim 1 and should be similarly allowable with claim 1 for at least the reasons provided above with regard to claim 1, and on their own merits. Specifically, the cited references do not disclose or suggest an apparatus comprising, *inter alia*, "an inlet port . . . configured to receive a flow of electrolytic solution comprising from about 10 to about 200 ppm of sodium chloride; and an outlet port . . . configured to provide an exit for the electrolytic solution comprising from about 2 ppm or less of chloride ions, much less an electrolytic solution comprising natural water and residual salts," as recited in claim 1. Consequently, the § 103(a) rejection of claims 25-26 should be withdrawn.

Rejection over Herrington in view of Spence and further in view of Graham

Claims 27 and 28 stand rejected to under 35 U.S.C. § 103(a) as being unpatentable over Herrington in view of Spence, and further in view of U.S. Patent No. 5,937,641 ("Graham"). The rejection is respectfully traversed.

Claims 27-28 depend from claim 1 and should be similarly allowable with claim 1 for at least the reasons provided above with regard to claim 1, and on their own merits. Specifically, the cited references do not disclose or suggest an apparatus comprising, *inter alia*, "an inlet port . . . configured to receive a flow of electrolytic solution comprising from about 10 to about 200 ppm of sodium chloride; and an outlet port . . . configured to provide an exit for the electrolytic solution comprising from about 2 ppm or less of chloride ions, much less an electrolytic solution comprising natural water and residual salts," as recited in claim 1. Consequently, the § 103(a) rejection of claims 25-26 should

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be withdrawn. Consequently, the § 103(a) rejection of claims 27 and 28 should be withdrawn.

CONCLUSION

In view of the above, Applicants respectfully submit that each of the issues raised by the Office Action has been addressed. Reconsideration and allowance of each of the pending claims is respectfully requested.

Respectfully Submitted,

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By  Signature

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